

CLAIMS

What is claimed is:

1. A reflective or semi-reflective coating for optical storage media, low emissivity glass, transparent conductive displays, and electro-chromic mirrors, said coating comprising an alloy comprising:
silver;
copper; and
zinc.
2. The coating of claim 1 further comprising tin.
3. The coating of claim 1 further comprising silicon.
4. The coating of claim 2 further comprising silicon.
5. The coating of claim 1, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.
6. The coating of claim 5, wherein said silver is between approximately 55% by weight and approximately 95% by weight.
7. The coating of claim 6, wherein said silver is between approximately 90% by weight and approximately 95% by weight.
8. The coating of claim 2, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.
9. The coating of claim 8, wherein said silver is between approximately 55% by weight and approximately 95% by weight.
10. The coating of claim 9, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

11. The coating of claim 3, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

12. The coating of claim 11, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

13. The coating of claim 12, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

14. The coating of claim 4, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

15. The coating of claim 14, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

16. The coating of claim 15, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

17. The coating of claim 1, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

18. The coating of claim 17, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

19. The coating of claim 18, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

20. The coating of claim 2, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

21. The coating of claim 20, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

22. The coating of claim 21, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

23. The coating of claim 3, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

24. The coating of claim 23, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

25. The coating of claim 24, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

26. The coating of claim 4, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

27. The coating of claim 26, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

28. The coating of claim 27, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

29. The coating of claim 1, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

30. The coating of claim 29, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

31. The coating of claim 30, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

32. The coating of claim 2, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

33. The coating of claim 32, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

34. The coating of claim 33, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

35. The coating of claim 3, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

36. The coating of claim 35, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

37. The coating of claim 36, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

38. The coating of claim 4, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

39. The coating of claim 38, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

40. The coating of claim 39, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

41. The coating of claim 2, comprising tin in an amount of between approximately 0.01% by weight and approximately 30% by weight.

42. The coating of claim 41, wherein said tin is between approximately 0.01% by weight and approximately 10% by weight.

43. The coating of claim 42, wherein said tin is between approximately 0.01% by weight and approximately 2% by weight.

44. The coating of claim 4, comprising tin in an amount of between approximately 0.01% by weight and approximately 30% by weight.

45. The coating of claim 44, wherein said tin is between approximately 0.01% by weight and approximately 10% by weight.

46. The coating of claim 45, wherein said tin is between approximately 0.01% by weight and approximately 2% by weight.

47. The coating of claim 3, wherein said silicon in an amount of between approximately 0.01% by weight and approximately 30% by weight.

48. The coating of claim 47, comprising silicon in an amount of between approximately 0.01% by weight and approximately 10% by weight.

49. The coating of claim 48, comprising silicon in an amount of between approximately 0.01% by weight and approximately 1% by weight.

50. The coating of claim 4, wherein said silicon in an amount of between approximately 0.01% by weight and approximately 30% by weight.

51. The coating of claim 50, comprising silicon in an amount of between approximately 0.01% by weight and approximately 10% by weight.

52. The coating of claim 51, comprising silicon in an amount of between approximately 0.01% by weight and approximately 1% by weight.

53. A reflective or semi-reflective coating for optical storage media, low emissivity glass, transparent conductive displays, and electro-chromic mirrors, said coating comprising an alloy comprising:

silver;

zinc; and

at least one metal selected from the group consisting of silicon and tin.

54. The coating of claim 53, comprising tin.

55. The coating of claim 53, comprising silicon.

56. The coating of claim 54, comprising silicon.

57. The coating of claim 53, wherein said silver is in an amount of between approximately 45% by weight and approximately 99.9% by weight.

58. The coating of claim 57, wherein said silver is in an amount of between approximately 55% by weight and approximately 95% by weight.

59. The coating of claim 58, wherein said silver is in an amount of between approximately 90% by weight and approximately 95% by weight.

60. The coating of claim 54, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

61. The coating of claim 60, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

62. The coating of claim 61, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

63. The coating of claim 55, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

64. The coating of claim 63, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

65. The coating of claim 64, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

66. The coating of claim 56, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

67. The coating of claim 66, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

68. The coating of claim 67, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

69. The coating of claim 53, wherein said zinc is in an amount of between approximately 0.1% by weight and approximately 55% by weight.

70. The coating of claim 69, wherein said zinc is in an amount of between approximately 0.1% by weight and approximately 10% by weight.

71. The coating of claim 70, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

72. The coating of claim 54, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

73. The coating of claim 72, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

74. The coating of claim 73, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

75. The coating of claim 55, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

76. The coating of claim 75, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

77. The coating of claim 76, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

78. The coating of claim 56, comprising zinc in an amount of between approximately 0.01% by weight and approximately 55% by weight.

79. The coating of claim 78, wherein said zinc is in an amount of between approximately 0.01% by weight and approximately 10% by weight.

80. The coating of claim 79, wherein said zinc is in an amount of between approximately 0.25% by weight and approximately 5% by weight.

81. The coating of claim 54, comprising tin in an amount of between approximately 0.01% by weight and approximately 30% by weight.

82. The coating of claim 81, wherein said tin is between approximately 0.01% by weight and approximately 10% by weight.

83. The coating of claim 82, wherein said tin is between approximately 0.01% by weight and approximately 2% by weight.

84. The coating of claim 56, comprising tin in an amount of between approximately 0.01% by weight and approximately 30% by weight.

85. The coating of claim 84, wherein said tin is between approximately 0.01% by weight and approximately 10% by weight.

86. The coating of claim 85, wherein said tin is between approximately 0.01% by weight and approximately 2% by weight.

87. The coating of claim 55, wherein said silicon in an amount of between approximately 0.01% by weight and approximately 30% by weight.

88. The coating of claim 87, comprising silicon in an amount of between approximately 0.01% by weight and approximately 10% by weight.

89. The coating of claim 88, comprising silicon in an amount of between approximately 0.01% by weight and approximately 1% by weight.

90. The coating of claim 56, wherein said silicon in an amount of between approximately 0.01% by weight and approximately 30% by weight.

91. The coating of claim 90, comprising silicon in an amount of between approximately 0.01% by weight and approximately 10% by weight.

92. The coating of claim 91, comprising silicon in an amount of between approximately 0.01% by weight and approximately 1% by weight.

93. A reflective or semi-reflective coating for optical storage media, low emissivity glass, transparent conductive displays, and electro-chromic mirrors, said coating comprising an alloy comprising:

silver;
copper; and
at least one metal selected from the group consisting of silicon and tin.

94. The coating of claim 93, comprising tin.

95. The coating of claim 93, comprising silicon.

96. The coating of claim 94, further comprising silicon.

97. The coating of claim 93, wherein said silver is in an amount of between approximately 45% by weight and approximately 99.9% by weight.

98. The coating of claim 97, wherein said silver is in an amount of between approximately 55% by weight and approximately 95% by weight.

99. The coating of claim 98, wherein said silver is in an amount of between approximately 90% by weight and approximately 95% by weight.

100. The coating of claim 94, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

101. The coating of claim 100, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

102. The coating of claim 101, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

103. The coating of claim 95, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

104. The coating of claim 103, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

105. The coating of claim 104, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

106. The coating of claim 96, wherein said silver is between approximately 45% by weight and approximately 99.9% by weight.

107. The coating of claim 106, wherein said silver is between approximately 55% by weight and approximately 95% by weight.

108. The coating of claim 107, wherein said silver is between approximately 90% by weight and approximately 95% by weight.

109. The coating of claim 93, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

110. The coating of claim 109, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

111. The coating of claim 110, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

112. The coating of claim 94, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

113. The coating of claim 112, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

114. The coating of claim 113, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

115. The coating of claim 95, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

116. The coating of claim 115, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

117. The coating of claim 116, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

118. The coating of claim 96, wherein said copper is between approximately 0.01% by weight and approximately 55% by weight.

119. The coating of claim 118, wherein said copper is between approximately 0.01% by weight and approximately 10% by weight.

120. The coating of claim 119, wherein said copper is between approximately 0.25% by weight and approximately 5% by weight.

121. The coating of claim 94, comprising tin in an amount of between approximately 0.01% by weight and approximately 30% by weight.

122. The coating of claim 121, wherein said tin is between approximately 0.01% by weight and approximately 10% by weight.

123. The coating of claim 122, wherein said tin is between approximately 0.01% by weight and approximately 2% by weight.

124. The coating of claim 96, comprising tin in an amount of between approximately 0.01% by weight and approximately 30% by weight.

125. The coating of claim 124, wherein said tin is between approximately 0.01% by weight and approximately 10% by weight.

126. The coating of claim 125, wherein said tin is between approximately 0.01% by weight and approximately 2% by weight.

127. The coating of claim 95, wherein said silicon in an amount of between approximately 0.01% by weight and approximately 30% by weight.

128. The coating of claim 127, comprising silicon in an amount of between approximately 0.01% by weight and approximately 10% by weight.

129. The coating of claim 128, comprising silicon in an amount of between approximately 0.01% by weight and approximately 1% by weight.

130. The coating of claim 96, wherein said silicon in an amount of between approximately 0.01% by weight and approximately 30% by weight.

131. The coating of claim 130, comprising silicon in an amount of between approximately 0.01% by weight and approximately 10% by weight.

132. The coating of claim 131, comprising silicon in an amount of between approximately 0.01% by weight and approximately 1% by weight.

133. An optical storage medium comprising the coating of claim 1.

134. An optical storage medium comprising the coating of claim 53.

135. An optical storage medium comprising the coating of claim 93.

136. A low emissivity glass comprising the coating of claim 1.

137. A low emissivity glass comprising the coating of claim 53.

138. A low emissivity glass comprising the coating of claim 93.

139. A transparent conductive display comprising the coating of claim 1.

- 140. A transparent conductive display comprising the coating of claim 53.
- 141. A transparent conductive display comprising the coating of claim 93.
- 142. An electro-chromic mirror comprising the coating of claim 1.
- 143. An electro-chromic mirror comprising the coating of claim 53.
- 144. An electro-chromic mirror comprising the coating of claim 93.
- 145. A method for physical deposition of a reflective or semi-reflective coating onto a substrate comprising the steps of:
 - providing a coating alloy comprising silver, zinc and copper; and
 - physically depositing the coating on the substrate.
- 146. The method of claim 145 wherein the coating alloy further comprises tin.
- 147. The method of claim 145 wherein the coating alloy further comprises silicon.
- 148. The method of claim 146 wherein the coating alloy further comprises silicon.
- 149. The method of claim 145 wherein the step of physically depositing comprises utilizing at least one deposition technique selected from the group consisting of sputtering, thermal evaporation, physical vapor deposition, electrolytic plating, and electroless plating.
- 150. A method for physical deposition of a reflective or semi-reflective coating onto a substrate comprising the steps of:
 - providing a coating alloy comprising silver, zinc and at least one component selected from the group consisting of silicon and tin; and
 - physically depositing the coating on the substrate
- 151. The method of claim 150 wherein the coating alloy comprises tin.
- 152. The method of claim 150 wherein the coating alloy comprises silicon.

153. The method of claim 151 wherein the coating alloy further comprises silicon.
154. The method of claim 150 wherein the step of physically depositing comprise utilizing at least one deposition technique selected from the group consisting of sputtering, thermal evaporation, physical vapor deposition, electrolytic plating, and electroless plating.
155. A method for physical deposition of a reflective or semi-reflective coating onto a substrate comprising the steps of:
 providing a coating alloy comprising silver, copper and at least one component selected from the group consisting of silicon and tin; and
 physically depositing the coating on the substrate
156. The method of claim 155 wherein the coating alloy comprises tin.
157. The method of claim 155 wherein the coating alloy comprises silicon.
158. The method of claim 156 wherein the coating alloy further comprises silicon.
159. The method of claim 155 wherein the step of physically depositing comprises utilizing at least one deposition technique selected from the group consisting of sputtering, thermal evaporation, physical vapor deposition, electrolytic plating, and electroless plating.